

## CLAIMS

1. A process for cleaning a reactor wherein the reactor is used to coat  $\text{TiO}_2$  onto an article, said process comprising:

providing the reactor to be cleaned wherein the reactor contains a chamber comprising a surface at least partially coated with a substance comprising  $\text{TiO}_2$ ;

adding to the reactor a reactive gas comprising at least one cleaning agent;

reacting the substance with the reactive gas to form at least one volatile product; and

removing from the reactor the at least one volatile product to clean the reactor.

2. The process of claim 1, wherein the at least one cleaning gas is selected from a fluorine-containing cleaning gas, a chlorine-containing cleaning gas, and combinations thereof.

3. The process of claim 2, wherein the at least one cleaning gas is a chlorine-containing cleaning gas.

4. The process of claim 3 wherein the chlorine-containing cleaning gas is at least one member selected from the group consisting of  $\text{BCl}_3$ ,  $\text{COCl}_2$ ,  $\text{HCl}$ ,  $\text{Cl}_2$ ,  $\text{ClF}_3$ , and  $\text{NF}_z\text{Cl}_{3-z}$ , where  $z$  is an integer from 0 to 2.

5. The process of claim 2 wherein the at least one cleaning gas is a fluorine-containing cleaning gas.

6. The process of claim 5 wherein the fluorine-containing cleaning gas comprises at least one member selected from  $\text{NF}_3$ ;  $\text{ClF}_3$ ;  $\text{ClF}$ ;  $\text{SF}_6$ ; a perfluorocarbon; a hydrofluorocarbon; an oxyfluorocarbon; a hypofluorite, a fluoroperoxide; a fluorotrioxide;  $\text{COF}_2$ ;  $\text{NOF}$ ;  $\text{F}_2$ ;  $\text{NF}_n\text{Cl}_{3-n}$ , where  $n$  is a number ranging from 1 to 2; and combinations thereof.

7. The process of claim 6, wherein the fluorine-containing cleaning gas is  $\text{NF}_3$ .

8. The process of claim 1, wherein the reactive gas further comprises an inert diluent gas.

9. The process of claim 1, wherein the reacting step is conducted by an in situ plasma, a remote plasma, an in-situ thermal source, a remote thermal source, a remote catalytic source, a photon activation source, and combinations thereof.

10. The process of claim 9, wherein the reacting step is conducted by an in situ plasma.

11. The process of claim 9 wherein the reacting step is conducted by a remote plasma.

12. The process of claim 1, wherein the reactive gas is conveyed to the chamber from a gas cylinder, a safe delivery system, a pipeline, a point of use delivery system, a vacuum delivery system, and combinations thereof.

13. The process of claim 1, wherein the fluorine-containing reactive gas is formed in close proximity to the reactor by a point-of-use generator.

14. The process of claim 1 wherein the article is selected from a glass-containing work piece, a metal-containing work piece, a ceramic work piece, and mixtures thereof.

15. A process for the deposition of a  $\text{TiO}_2$  coating on a glass article, the process comprising:

placing the glass article into a reactor;

depositing the  $\text{TiO}_2$  coating onto the glass article and a substance comprising  $\text{TiO}_2$  onto at least one surface within the reactor using at least one metal precursor wherein the depositing step is conducted by a process selected from chemical vapor deposition, vacuum deposition, spray pyrolysis and combinations thereof;

adding to the reactor a reactive gas comprising at least one cleaning agent;

reacting the substance with the reactive gas to form at least one volatile product;

and

removing from the reactor the at least one volatile product to clean the reactor.